

# YORK— DURHAM WATER AND SEWAGE SERVICE SYSTEMS



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Ministry  
of the  
Environment

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## BACKGROUND

The following summary outlines, in chronological order, the involvement of the former Ontario Water Resources Commission and now the Ministry of the Environment in the development of projects relative to the provision of major water and sewage works to service the area immediately north and east of the Municipality of Metropolitan Toronto.

In 1965, realizing the potential development in the area would likely create problems with respect to the availability of water and sewage services, the OWRC undertook an evaluation of the ground water sources and the long-term capabilities of the Humber, Don and Rouge Rivers as receiving streams.

The basic conclusions of these studies were:

1. No further upstream sewage treatment plants should be permitted on the Humber, Don and Rouge Rivers;
2. Ground water is not available in sufficient quantities to accommodate the expected growth in the southern portions of the study area;
3. The Metropolitan Toronto water supply system should be extended to serve the area north of Metropolitan Toronto; and
4. A trunk sewer system should be provided to direct sewage flows from the study area north of Metropolitan Toronto to a sewage treatment plant east of Metropolitan Toronto on the shore of Lake Ontario.

These conclusions established the basic criteria for all subsequent water and sewage studies undertaken by the Commission.

In 1966, the Commission engaged the consulting engineering firm of Gore & Storrie Limited to prepare an engineering report on the water and sewage servicing requirements of the areas adjacent to Metropolitan Toronto included within the watersheds of the Humber, Don and Rouge Rivers.

The Gore & Storrie report was completed in mid 1967 and outlined a system of water and sewage works, together with capital costs.

In October of 1969 a proposal was presented to senior officials of the affected municipalities. This proposal was submitted on the basis that water and sewage services would be provided to the study area based on Provincially-financed systems with the recovery of costs on a user basis. This necessitated a finalization of area planning and population projections.

In 1970 the Province released a report entitled Design for Development, the Toronto-Centred Region which established the basis of overall planning for the area.

On January 1, 1971, the Regional Municipality of York was formed.

On January 1, 1974, the Regional Municipality of Durham was formed.

In August of 1971, a further report entitled A Status Report on the Toronto-Centred Region was released by the Ontario Government. This report provided target population figures for the Central York and south-west Pickering areas. Direct reference to the report best defines

our present status.

"On the basis of these population allocations, the Ontario Water Resources Commission has been instructed to explore the possibilities and costs of a major servicing scheme in the Central York area."

Subsequently, Gore & Storrie were appointed to revise their previous report on the basis of the target population figures provided by the Government and to submit their report early in 1972.

On February 29, 1972, "The Report on Water and Sewage Systems - Central York Service Area" was submitted to the then Ontario Water Resources Commission by Gore & Storrie Limited. After the Commission was put in receipt of this report, the Federal and Provincial Governments in March of 1972 announced the proposal to construct a new airport in North Pickering and the population projection for the North Pickering Community was increased to 200,000.

An addendum report on the water and sewage systems was prepared and submitted by Gore & Storrie to the Ministry of the Environment on May 18, 1972. This addendum report reflected the changes necessary as a result of the proposed North Pickering Community and airport development. Following receipt of the addendum to the report the Ministry of the Environment prepared a summary report and financial analysis outlining proposed timing, phasing of construction, cost of service and an outline of necessary action to finalize service agreements between the various participating municipal bodies. This summary report and proposal were announced in the Provincial Legislature on June 16, 1972. Following that announcement, a press release

was made by the Honourable Darcy McKeough, then Minister of Treasury, Economics and Intergovernmental Affairs and the Honourable James Auld, then Minister of the Environment, at which time copies were made available to officials and all interested parties.

In November, 1972, James F. MacLaren, Consulting Engineers were engaged as prime consultants to refine the major elements of the Project. Simultaneously Proctor & Redfern were retained to recommend a site for the Water Pollution Control Plant near the mouth of Duffin Creek.

The effect of both these reports was to confirm the project. Subsequently this Ministry has worked to refine the projects through a series of meetings with the affected municipalities. Several Consulting Engineers have been engaged to prepare detailed engineering drawings for the major elements of the sewage facilities. The Environmental Hearing Board has recommended approval of a plant site at Squire's Beach at the mouth of Duffin's Creek. The Ministry has adopted this recommendation. In another hearing, the entire system plan was presented to the public.

The project will provide service to the former Township of Pickering, the Village of Pickering, the Town of Ajax (now incorporated into the Regional Municipality of Durham as of January 1, 1974) the proposed North Pickering Development Complex and the south portion of the Regional Municipality of York. Construction of the sewage portion of the project will remove from service some nine (9) existing sewage treatment plants, six (6) of which are tributary to existing water courses that flow through Metropolitan Toronto, and three tributary to Lake Ontario in the Pickering Area.

### Conclusions

The development of these projects over the last seven years has been delayed several times. This had led to a continuously mounting pressure for urban serviced land in the area. The projects were originally proposed to resolve difficult servicing problems in the Central York area. Realizing their significance, the Government directed that the projects be coordinated with the Provincial development concept for the area. It must be emphasized therefore that these projects can no longer be considered as the proposals of a single Ministry of the Government but rather as major Provincial undertakings which will in fact materially reduce major sources of pollution from urban water-courses, direct growth and development as intended in the Toronto-Centred Region Concept both north and east of Metropolitan Toronto, materially reduce the pressures for serviced land for housing, permit the servicing of the North Pickering Development complex east of Metropolitan Toronto, and finally, as originally intended, resolve the difficult servicing problems in the Central York Area.

BASIS OF PROPOSAL

(a) Area of Study

These proposals are submitted on the basis of water and sewage services for the areas as more specifically set out in the body of the brief.

(b) Population

For the purposes of designing the South Central York Servicing Project, the total population target for the Region of York, as proposed in the "Submission by the Regional Municipality of York on the Toronto-Centred Region Concept" was employed. This figure, together with an appropriate allowance for industrial development, was used for servicing design purposes. The population target for shorter-term planning purposes, with corresponding targets for the various communities in South Central York, are being determined through detailed study of the communities as part of the Regional Municipality of York's official planning process. The projected populations for the urban and industrial areas to be serviced are shown in Table 1. They represent, at best, the current information available, but are subject to refinement as outlined above.

In a similar fashion, population allocations for the south west portion of the Regional Municipality of Durham are based on available current information.

TABLE 1

Population Projections for Intermediate Years

	<u>1970</u>	<u>1975</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>	<u>1995</u>	<u>Ultimate</u>
Woodbridge	2,500	6,000	9,500	13,000	16,500	20,000	20,000
Maple	1,200	1,960	2,720	3,480	4,240	5,000	10,500
North Metro Fringe	16,000	23,500	34,700	50,000	70,000	95,000	136,000
Newmarket	19,000	22,500	26,000	29,500	33,000	36,000	44,000
Aurora	10,000	14,000	17,500	21,000	24,500	28,000	31,000
Oak Ridges	4,700	4,760	4,820	4,880	4,940	5,000	6,500
Richmond Hill	28,000	35,910	43,610	51,410	59,210	67,000	105,000
Markham-Unionville	10,000	16,000	22,000	28,000	34,000	40,000	63,000
North Pickering Community Development Complex	-	-	7,500	25,000	70,000	125,000	200,000
Southwest Pickering*	<u>33,500</u>	<u>43,000</u>	<u>60,000</u>	<u>87,500</u>	<u>112,500</u>	<u>149,360</u>	<u>186,600</u>
TOTAL	124,900	167,630	228,350	313,770	428,890	570,960	802,600

\* Southwest Pickering totals exclude the West Rouge area but incorporate Pickering Village and Ajax totals

(c) Sewage Proposal

It is proposed that all sewage from local sanitary sewer systems in each urban node be collected by means of a trunk sewer system consisting of pumping stations, forcemains, gravity sewers and tunnels directing the total flow to a water pollution control plant to be located in the Regional Municipality of Durham in the vicinity of Duffin's Creek and discharging fully-treated effluent to Lake Ontario.

In order to provide serviced land as quickly as possible following agreement by the participants, three interim connections to the Metropolitan Toronto Sewage System are planned for along Steeles Avenue at its intersection with Dufferin, Bayview and Leslie Streets. In addition, this Ministry will examine other means of increasing plant throughput pending completion of the main trunk sewer and treatment plant. See Figure I for the scope and staging of the sewerage scheme.

(d) Water Proposal

It is proposed that water be supplied from the Metropolitan Toronto system by the following methods:

- (i) Direct connections to the Metropolitan Toronto system of trunk mains where adequate pressure is available to meet the requirements of the local needs.
- (ii) A system of pumping stations, reservoirs

and trunk supply mains serving an urban node at service pressure.

- (iii) By a combination of direct connections and continuation in service of present production facilities where existing quality and capacity are adequate.

See Figure II for the scope and staging of the water distribution scheme.

# YORK/DURHAM PROVINCIAL WATER WORKS PROJECT 5-0039-67 SYSTEM PHASING

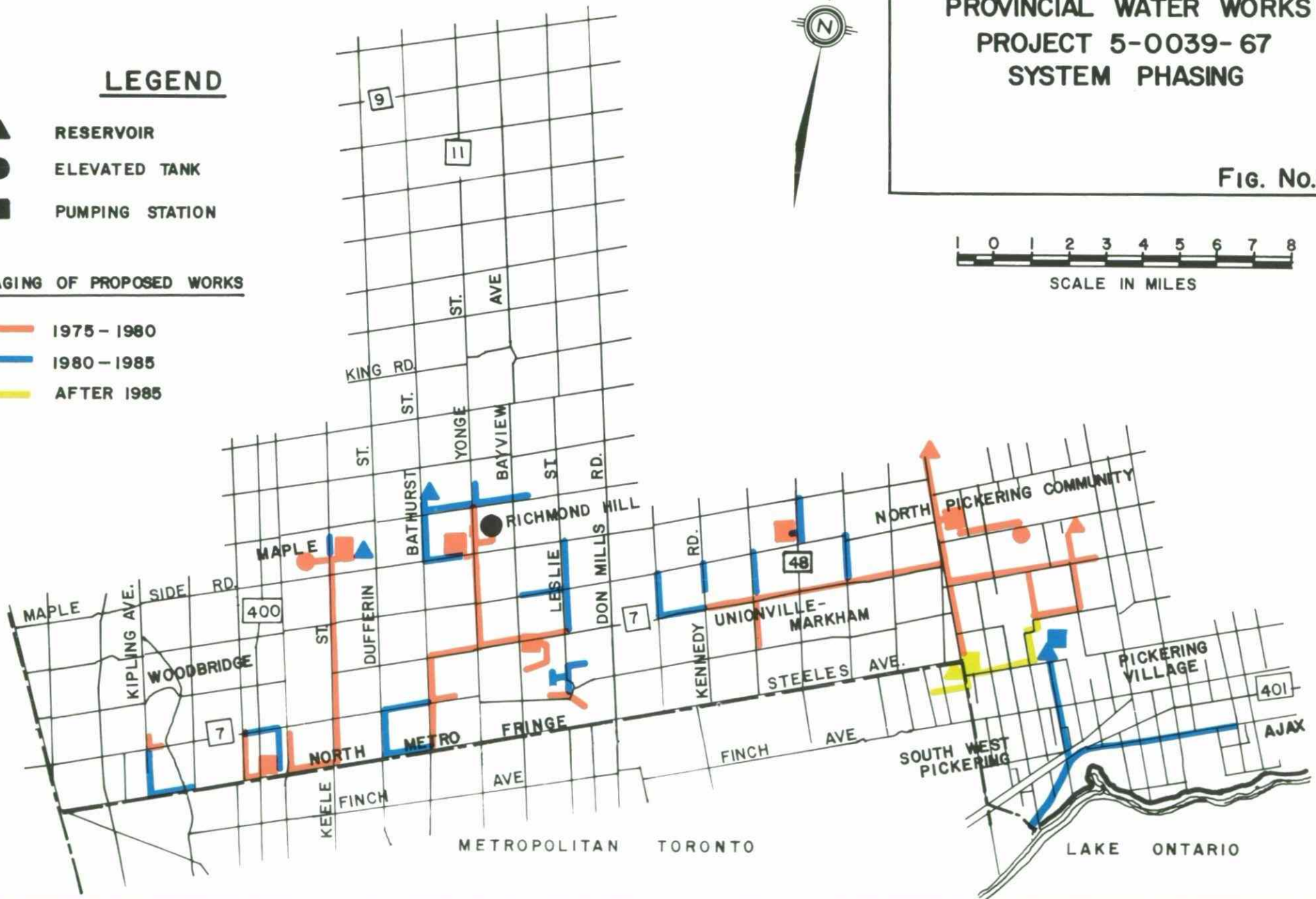
Fig. No.2

## LEGEND

- ▲ RESERVOIR
- ELEVATED TANK
- PUMPING STATION

## STAGING OF PROPOSED WORKS

- 1975 - 1980
- 1980 - 1985
- AFTER 1985



## SEWAGE WORKS

### (a) Existing Conditions

#### (i) Central York

At present, there are eight sewage treatment plants located north of Steeles Avenue. Six plants discharge treated sewage effluent to small watercourses that flow through Metropolitan Toronto to Lake Ontario. Two flow northerly to Lake Simcoe.

#### (ii) Ajax/Pickering Areas

At present, there are three sewage treatment plants located east of Metropolitan Toronto. Two of these plants discharge treated sewage effluent into Duffin Creek and thence to Lake Ontario. One plant discharges directly to the Lake.

### (b) Construction Programme

The system will be constructed in stages to provide for; -

- (i) Immediate relief in those areas where overloading of existing facilities is greatest.
- (ii) Minimization of capital expenditure during the early years when population is low in relation to ultimate.

### (c) Capital Works

#### (i) Stage 1 (1974-75)

Interim connections from Central York to existing Metropolitan Toronto sewers include:

- along West Don River from the West Don W.P.C.P. to Steeles Ave. (Maple Collector), then along the valley south from Steeles Ave. to the existing Metro Toronto sewer.
- along the East Don River from John St. W.P.C.P. to Steeles Ave.

at Bayview Ave. (Bayview Collector)

- along the East Don River from Langstaff Rd. to the John St. P.S. (North Don Collector)
- from Yonge St. north of Hwy. 7 to approximately 3,000' south of Hwy. 7 (Central Collector)
- along the East Don River from the German Mills Transmission Sewer to an existing Region of York sewer just south of John St. (Leslie Collector)
- along the East Don River from the existing Richmond Hill W.P.C.P. to the South-East Transmission Trunk (German Mills Transmission Section)

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This stage also marks the beginning of construction of major works along the eventual sewer alignment east of those above connections:

- commencement of the 401 - South-West Pickering Collector
- commencement of the South-East Transmission Trunk along easements and road allowances from the Duffin Creek W.P.C.P. north and westerly
- continuance of the use of the existing sewage treatment plants at Newmarket, Aurora, Unionville, Markham, Pickering Village, Ajax and the Township of Pickering
- Baif, West Don, John St. and Richmond Hill plants must also continue to operate with excess flows only carried to Metro trunks
- acquisition of all affected existing sewage treatment works
- acquisition of property required for new construction

The total estimated cost for Stage 1 is approximately \$12 million.

(c) Capital Works

(ii) Stage 11 (1975-1980)

- discontinuance of sewage flow to Metropolitan Toronto upon completion of the six-year time period as set out in the York Region - Metropolitan Toronto - Ministry of the Environment agreement
- construction of a 32 MGD water pollution control plant near the mouth of the Duffin Creek
- completion of the main trunk sewer (South-East Transmission Section)
- commencement of the Woodbridge Collector system
- construction of the South-West Collector system
- construction of the Bayview Collector system
- construction of the Leslie Collector system
- completion of the 401 - South-West Pickering collector system
- construction of the Ajax and Pickering Village collector systems
- construction of the John St. Transmission Section
- construction of the Maple Collector system

The total estimated cost for Stage 11 approximates \$72 million

(c) Capital Works

(iii) Stage 111 (1980-1985)

Stage 111 works provide for: -

- full outlet capacity for Newmarket, Aurora and Oak Ridges, ie. Collector section to direct sewage southerly to the main trunk sewer system
- commencement of construction of the North Pickering Collector system

- completion of the 2nd 32 MGD module at the Duffin Creek W.P.C.P.

The total estimated cost for Stage III approximates \$33 million

(c) Capital Works

(iv) Stage IV 9(1985-1993)

Stage IV works provide for: -

- completion of the Woodbridge Collector system
- completion of the North Pickering Collector system
- completion of the 3rd 32 MGD module for the Duffin's Creek W.P.C.P.

The total estimated cost for Stage IV approximates \$24 million

## LEGEND

--- EXISTING TRUNK SEWER

▲ EXISTING W.P.C.P.

### COLLECTOR SYSTEMS

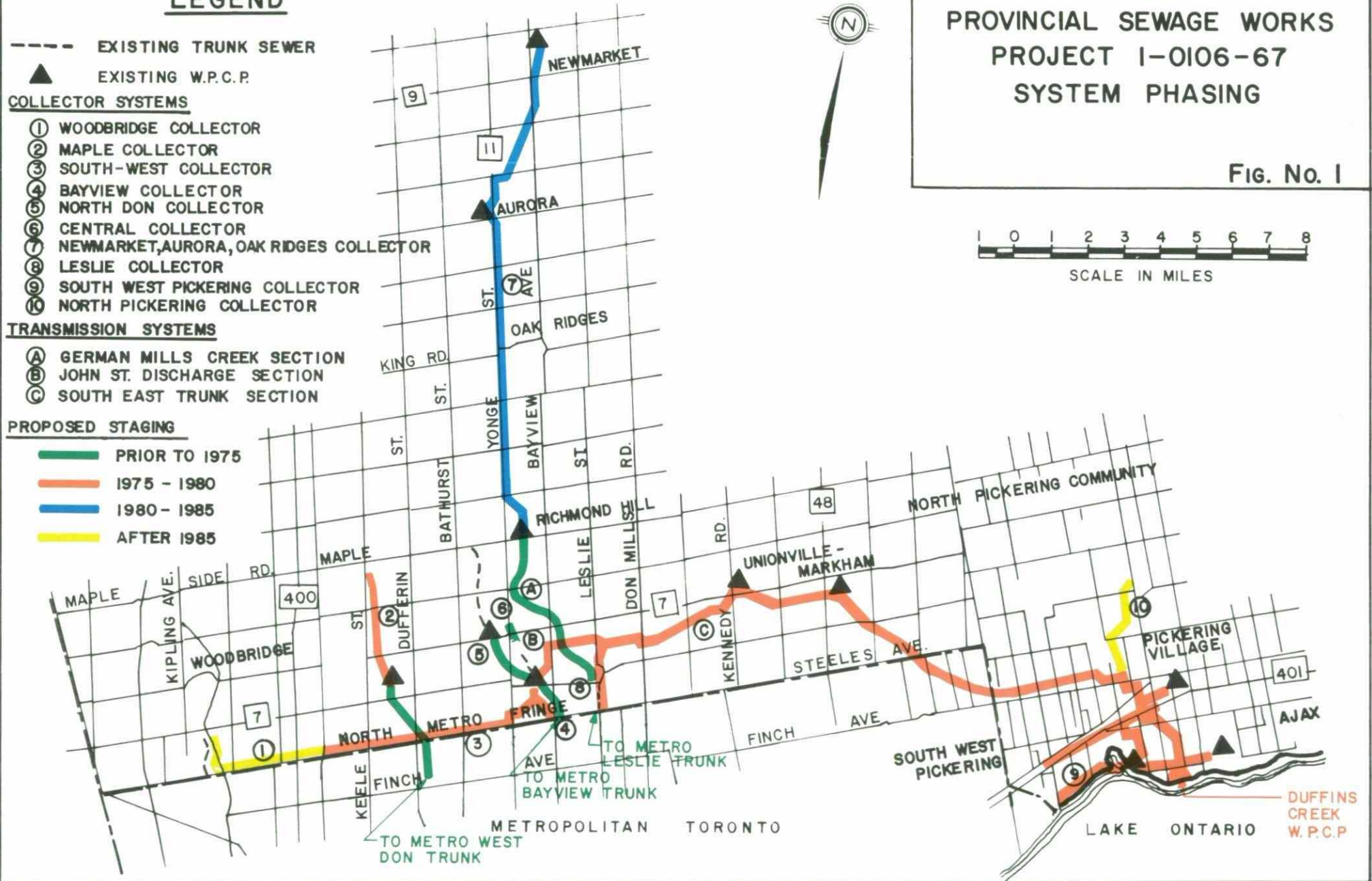
- ① WOODBRIDGE COLLECTOR
- ② MAPLE COLLECTOR
- ③ SOUTH-WEST COLLECTOR
- ④ BAYVIEW COLLECTOR
- ⑤ NORTH DON COLLECTOR
- ⑥ CENTRAL COLLECTOR
- ⑦ NEWMARKET, AURORA, OAK RIDGES COLLECTOR
- ⑧ LESLIE COLLECTOR
- ⑨ SOUTH WEST PICKERING COLLECTOR
- ⑩ NORTH PICKERING COLLECTOR

### TRANSMISSION SYSTEMS

- A GERMAN MILLS CREEK SECTION
- B JOHN ST. DISCHARGE SECTION
- C SOUTH EAST TRUNK SECTION

### PROPOSED STAGING

- PRIOR TO 1975
- 1975 - 1980
- 1980 - 1985
- AFTER 1985



## YORK / DURHAM PROVINCIAL SEWAGE WORKS PROJECT 1-0106-67 SYSTEM PHASING

Fig. No. 1

1 0 1 2 3 4 5 6 7 8  
SCALE IN MILES

WATER WORKS

(a) Existing Conditions

(i) Central York

The existing development in the Central York Area is supplied with ground water. The total existing well supply capacity is approximately 15 MGD. The raw water is very hard, high in alkalinity and in some cases contains excessive amounts of iron.

(ii) Pickering Area

The existing development in southwest Pickering is presently supplied from a 3.75 MGD water purification plant on the north shore of Lake Ontario at the south end of Brock Road. Ajax and the Village of Pickering are supplied from a 5 MGD water purification plant located on the north shore of Lake Ontario near the foot of Harwood Avenue South.

(b) Construction Programme

The system will be constructed in stages to provide for; -

- (i) Immediate relief in those areas of Central York where supply from existing facilities is inadequate.
- (ii) Minimization of capital expenditures during the early years by a combination of new facilities and utilization of existing works where capacity is known to exist.

(c) Capital Works

(i) Stage 1 (1975-1978) & Stage 1 (1978-1980)

Stage 1 works provide for the construction of immediate facilities in Central York to provide for; -

- Woodbridge, Highway 400 and Steeles Avenue areas
- Maple area
- portions of North Metro Fringe
- southwest Richmond Hill area

- Markham-Unionville areas
- Initial stage of the North Pickering Community Development Project
- acquisition of property for new construction

Existing ground water sources will be phased out of operation during this period. The Towns of Newmarket and Aurora, as well as the Community of Oak Ridges, will not be serviced from Metropolitan Toronto.

The total estimated cost for Stage I is \$28 million

(ii) Stage II (1980-1985)

Stage II provides additional works to complete the water supply system for Central York and Pickering and to extend a supply of Metropolitan Toronto water to the Town of Ajax. During this stage, service to the south-west Pickering area as well as Pickering Village is also completed. The Pickering and Ajax water purification plants can be phased out of operation in this stage. The total estimated cost of Stage II is \$11 million.

(iii) Stage III (1985 - ultimate)

Stage III provides for the completion of the water supply system for the North Pickering Community Development Complex.

The total estimated cost of Stage III is \$8 million.

BASIS OF ANALYSIS

(a) Capital Costs (Summary)

(i) Sewage Works

STAGE 1	\$ 12,000,000.
STAGE 11	\$ 72,000,000.
STAGE 111	\$ 33,000,000.
STAGE 1V	\$ 24,000,000.
TOTAL	\$141,000,000.

(ii) Water Works

STAGE 1	\$ 28,000,000.
STAGE 11	\$ 11,000,000.
STAGE 111	\$ 8,000,000.
TOTAL	\$ 47,000,000.

(b) Acquisitions

An allowance for eight million dollars (\$8 million) has been included in the financial analysis for the service rates for the assumption of that portion of the applicable debt for the existing water pollution control and water production, treatment and storage facilities now the responsibility of the Regional Municipalities of York and Durham.

Local water distribution works and sub-collector systems for sewage will remain the responsibility of the respective existing authorities.

(c) Population, Water and Sewage Flows

The analyses are based on the following population projections and water usage.

(i) Sewage Works

	1975	1985	1993	1995
Total population served	120,370	303,770	503,778	560,360

Daily flow (M.G.)	14.0	49.6	91.6	105.3
Per capita flow (gpcd)	71.0	75.0	78.2	79.0
Annual flow (M.G.)	5,110	18,104	33,434	38,435

(ii) Water Works

	<u>1975</u>	<u>1985</u>	<u>1993</u>	<u>1995</u>
Total population served	126,370	258,390	447,402	501,360
Daily flow (M.G.)	10.1	25.8	52.8	59.2
Per capita flow (gpcd)	80.0	100.0	118.0	118.0
Annual flow (M.G.)	3,687	9,417	19,272	21,608

(d) Operating Cost

The financial analyses are related to all of the works being completely owned as Provincial works under the Ontario Ministry of the Environment and the proposed rates include amortization of capital expenditures at current rates of interest, together with all operating costs.

(e) Financial Assistance

The proposed rates include financial assistance by the Province of Ontario in an amount of approximately 15% of the gross capital cost of Stage I and Stage II. C.M.H.C. assistance has also been applied to all stages of the project at the usual loan rate (66% of all eligible works) with a 25% forgiveness factor.